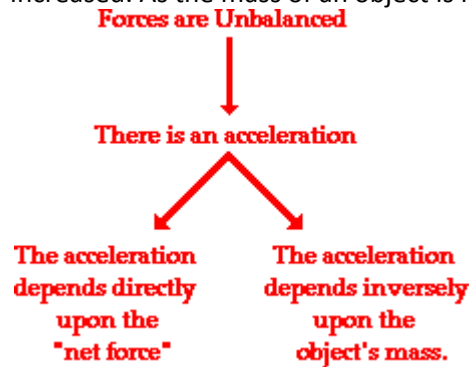


Newton's second law of motion

Newton's second law of motion pertains to the behaviour of objects for *which all existing forces are not balanced*. The second law states that the acceleration of an object is dependent upon two variables - the [net force](#) acting upon the object and the mass of the object. The acceleration of an object depends directly upon the net force acting upon the object, and inversely upon the mass of the object. As the force acting upon an object is increased, the acceleration of the object is increased. As the mass of an object is increased, the acceleration of the object is decreased.



Newton's second law of motion can be formally stated as follows:

The acceleration of an object as produced by a net force is directly proportional to the magnitude of the net force, in the same direction as the net force, and inversely proportional to the mass of the object.

This verbal statement can be expressed in equation form as follows:

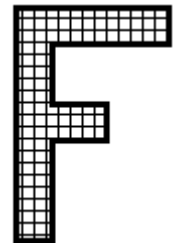
$$a = F_{\text{net}} / m$$

The above equation is often rearranged to a more familiar form as shown below. The net force is equated to the product of the mass times the acceleration.

$$F_{\text{net}} = m * a.$$

Consistent with the above equation, a unit of force is equal to a unit of mass times a unit of acceleration. By substituting standard metric units for force, mass, and acceleration into the above equation, the following unit equivalency can be written.

$$1 \text{ Newton} = 1 \text{ kg} * \frac{\text{m}}{\text{s}^2}$$



The definition of the standard metric unit of force is stated by the above equation. One Newton is defined as the amount of force required to give a 1-kg mass an acceleration of 1 m/s/s.

	Net Force (N)	Mass (kg)	Acceleration (m/s/s)
1.	10	2	
2.	20	2	
3.	20	4	
4.		2	5
5.	10		10